

**ATTACHMENTS**

- List of Documents Not Yet Indicated as Considered by the Examiner (Courtesy Copy).
- Completion of Record

**REMARKS**

This Amendment is responsive to the Final Office Action mailed December 8, 2010. With this Amendment, claims 1, 3, 6-8, 10-13, and 17-19 have been amended, and claim 9 has been canceled. Claims 1-8 and 10-33 are pending. Claims 1-8, 10-12, and 33 are under consideration. Claims 13-32 are withdrawn. No new matter has been added.

Entry of this Amendment after Final Rejection is appropriate because the amendments herein reduce issues for appeal and do not require further search and/or consideration. In particular, Applicants note that the instant amendments include the cancelation of previously-examined claim 9, and incorporation of the features of claim 9 into claim 1. The amendments also include changes in claim dependencies in accordance with the cancelation of claim 9.

Reconsideration and withdrawal of the rejections made in the above-referenced Office Action are respectfully requested in view of the foregoing amendments and the following remarks.

**Requirement for Restriction**

Claims 13-32 are withdrawn as directed to non-elected subject matter. Applicants respectfully request that the Examiner reconsider the Requirement for Restriction, and that the Examiner rejoin all of the withdrawn claims upon the indication of allowable subject matter, as appropriate, in accordance with the rules for Unity of Invention/National Stage Applications under 35 U.S.C. § 371. However, Applicants preserve their right to file one or more suitable continuation and/or divisional applications to the non-elected subject matter.

**Information Disclosure Statement**

The Office Action indicates that Applicants' previous arguments regarding consideration of foreign language documents listed in an Information Disclosure Statement (IDS) have been found persuasive. In addition, the Office Action indicates consideration of the documents listed in the Supplemental IDS filed January 13, 2010.

In accordance with Applicants' previous arguments, Applicants submit herewith a list of documents which were previously provided and listed on an Information Disclosure Statement, but not yet indicated as considered by the Examiner. Applicants submit that the documents listed on the attached sheet include foreign language documents for which English-language patent family members and/or relevancy statements were previously provided, as appropriate. Accordingly, the Examiner is requested to indicated consideration of the listed documents and to return a copy of the attached list with the next official communication.

Claim Rejections – 35 U.S.C. § 102

The Office Action maintains the rejection of claims 1-8 and 33 under 35 U.S.C. §102(b) as allegedly anticipated by US 2003/0003340 A1 to Honma et al. (hereinafter "Honma").

In response, and without acquiescing to the propriety of the rejection, Applicants submit that the claimed subject matter is not anticipated by Honma. In particular, Applicants submit that claim 1 has been amended to incorporate the features of claim 9, and that Honma fails to teach or suggest a proton conducting membrane comprising, *inter alia*, a support filled with a proton conducting structure ( $\beta$ ) as claimed.

Accordingly, Applicants respectfully request reconsideration of the anticipation rejection over Honma and withdrawal of the same.

Claim Rejections – 35 U.S.C. § 103

The Office Action also maintains the rejection of claims 9-12 under 35 U.S.C. §103(a) as allegedly unpatentable over Honma in view of US 2004/0197613 A1 to Curlier et al. (hereinafter "Curlier").

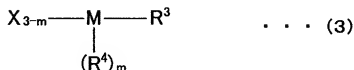
In response, Applicants respectfully disagree.

Initially Applicants note that Honma discloses a proton-conducting membrane comprising a carbon-containing phase (1) and an inorganic acid phase (2). In particular, the proton-conducting membrane is characterized by a phase-separated structure containing a carbon-containing phase containing at least 80% by volume of a carbon-containing compound,

as well as an inorganic phase containing at least 80% by volume of an inorganic acid (See Abstract). *The inorganic phase forms continuous ion-conducting paths. Id.* Thus, it is the inorganic phase of the membrane taught by Honma which conducts protons.

In contrast Applicants submit that the claimed subject matter is directed, *inter alia*, to a proton conducting membrane comprising a support filled with a proton conducting structure ( $\beta$ ) comprising

a crosslinked structure having an acid group-containing structure (A) represented by the following formula (3):



wherein M represents a silicon atom; X represents an -O-bond taking part in crosslinking or an OH group;  $\text{R}^3$  represents a molecular chain having at least one acid group;  $\text{R}^4$  represents any of methyl, ethyl, propyl and phenyl groups; and m represents 0, 1 or 2. Thus, the proton conducting inorganic phase of Honma is not the same as the proton conducting structure ( $\beta$ ) as claimed.

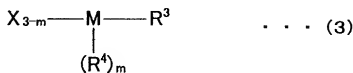
Indeed, the differences between the proton conducting membrane of Honma and Applicants' claimed subject matter are rendered even clearer by a more detailed consideration of the structures disclosed in Honma. In the Abstract and in paragraphs [0092] – [0093] Honma discloses that it is important that the proton-conducting membrane comprise at least three components: a three-dimensionally crosslinked silicon-oxygen structure (A), a carbon-containing compound (B) bound covalently to (A), and an inorganic acid (C). The inorganic acid may be sulfonic acid (See, e.g., paragraph [0129]). *Further, the inorganic acid (C) imparts the proton conductivity to the membrane* (See, e.g., paragraph [0129]). In contrast, Applicants' claimed subject matter is directed, *inter alia*, to a protein conducting structure ( $\beta$ ), which is not disclosed or suggested by Honma.

Moreover, Applicants note that in the response to Applicants' previous arguments, the Office Action directs Applicants' attention to Figure 2, noting that "[i]t is clear that the support

structure (2) has pores that are filled by the proton conducting structure (1)" (Office Action at page 7, top). However, Applicants understand Figure 2 to show a phase-separated structure comprising a carbon-containing phase (1) and an inorganic, proton-conducting phase (2). The carbon-containing phase contains a carbon-containing compound bound covalently to a crosslinked silicon-oxygen structure, whereas the inorganic phase contains an inorganic acid, e.g., sulfonic acid. Thus, Applicants understand the proton-conducting phase to be the inorganic phase (2) and not "pores that are filled by a proton conducting structure (1)" as asserted in the Office Action.

Applicants further submit that Curlier fails to compensate for the deficiencies of Honma. In particular, Curlier discloses a membrane having channels having a silicon-containing acid group attached to the channels (See, e.g., paragraph [0204]). Thus, assuming *arguendo* that one of ordinary skill in the art were to combine Honma and Curlier, the resulting structure would not yield a proton conducting structure ( $\beta$ ) as claimed, but rather a membrane with channels having an inorganic acid inside the channels and/or silicon-containing acid groups attached to the channels. In contrast, Applicants' claimed invention is directed, *inter alia*, to a proton-conducting structure ( $\beta$ ) comprising

a crosslinked structure having an acid group-containing structure (A) represented by the following formula (3):



wherein M represents a silicon atom; X represents an -O-bond taking part in crosslinking or an OH group;  $\text{R}^3$  represents a molecular chain having at least one acid group;  $\text{R}^4$  represents any of methyl, ethyl, propyl and phenyl groups; and m represents 0, 1 or 2.

In view of the above, Honma and Curlier fail to render the claimed subject matter obvious. Indeed, Honma and Curlier in combination fail to teach each and every feature of the claimed invention.

Based at least on the foregoing, Applicants respectfully request reconsideration and withdrawal of the obviousness rejection over Honma in view of Curlier.

Obviousness-Type Double Patenting

The Office Action also rejects claims 1, 6, 9, and 10 on the ground of nonstatutory obviousness-type double patenting as allegedly being unpatentable over claims 1, 2, 8, and 9 of U.S. Patent No. 7,214,756.

In response, and without acquiescing to the propriety of the rejection, Applicants submit that the instant Amendment renders the present rejection moot at least with respect to claim 9. Applicants further submit that the instant Amendment is responsive to the present rejection with respect to claims 1, 6 and 10 as well. Thus, to the extent that the rejections have been overcome based on the instant amendment, Applicants respectfully request reconsideration and withdrawal of the obviousness-type double patenting rejection. However, to the extent that the present Amendment does not address the Examiner's concerns, Applicants request that the Examiner hold the obviousness-type double patenting rejections in abeyance until the claims are found free of the art.

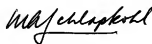
### CONCLUSION

In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections of record, and allow all the pending claims.

No additional fee is believed due at this time. If, however, any additional fee is necessary to ensure consideration of the submitted materials, the Patent and Trademark Office is hereby authorized to charge the same to Deposit Account No. 19-0089.

Should the Examiner have any questions, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully Submitted,  
Toshihito MIYAMA et al.



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